Stochastic approximation with adaptive step sizes for optimization in noisy environment and its application in regression models

MILENA KRESOJA[1], MARKO DIMOVSKI[2] ,
IRENA STOJKOVSKA[2] , ZORANA LUŽANIN[1]

[1] *Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad, Serbia*
[2] *Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University, Skopje, R. Macedonia*
milena.kresoja@dmi.uns.ac.rs, zorana@dmi.uns.ac.rs
mdimovski16@gmail.com, irenatra@pmf.ukim.mk

We propose a method for optimization problems in noisy environment. The method represents a modification of Stochastic Approximation algorithm based on a new adaptive step sizes scheme and it is extended to case where general descent direction is taken instead of noisy gradient. Proposed adaptive step size scheme uses only a predefined number of last noisy functional values to select a step size for the next iterate. The almost sure convergence is established under suitable assumptions. Numerical results indicate a good performance of the method. Application of the method in regression models is presented.